

REMARKS

The Office Action dated October 7, 2003, has been received and carefully noted.

The amendments made herein and the following remarks are submitted as a full and complete response thereto.

Claims 1 and 3 have been amended. Applicant submits that the amendments made herein are fully supported in the specification and the drawings as originally filed, and therefore no new matter has been added. Accordingly, claims 1-3 are pending in the present application and are respectfully submitted for consideration.

The specification has been amended to clarify the subject matter of the present invention.

Claims 1-3 were rejected under 35 U.S.C. § 102(b) as being anticipated by Kumagai et al. (U.S. Patent No. 5,742,378, "Kumagai"). Applicant respectfully submits that each of claims 1-3 recites subject matter that is neither disclosed nor suggested by the cited prior art.

Claim 1 recites an automatic focusing mechanism for mounting on a measuring device having a telescope for sighting a leveling rod with pattern marks marked thereon at an equal pitch between each mark, and a photoelectric device for converting an image sighted by said telescope into an electric signal with a set range to thereby automatically adjust a focus on the leveling rod. The mechanism includes a driving means for moving a focusing lens of the telescope from one end toward an opposite end of a movable range of the focusing lens, a pitch computing means for obtaining only the pitch of the pattern marks of the leveling rod at a position on the photoelectric device

which is capable of obtaining the pitch in a state before the focusing lens is focused on the leveling rod to thereby obtain a distance to the leveling rod based only on the pitch obtained by the pitch computing means, without scanning an entire distance range for focusing, and a fine adjusting means for moving the focusing lens to a position corresponding to the distance.

Claim 3 recites an automatic focusing mechanism for mounting on a measuring device having a telescope for sighting a leveling rod with pattern marks marked thereon at an equal pitch between each mark, and a photoelectric device for converting an image sighted by said telescope into an electric signal with a set range to thereby automatically adjust a focus on the leveling rod. The mechanism includes a driving means for moving a focusing lens of said telescope to a predetermined position within a movable range of the focusing lens, a pitch computing means for obtaining only the pitch of the pattern marks of the leveling rod on the photoelectric device to obtain a distance to the leveling rod based only on the pitch obtained by the pitch computing means, without scanning a distance range for focusing, and a fine adjusting means for moving said focusing lens to a position corresponding to the distance.

Accordingly, at least one of the essential features of the present invention is "a pitch computing means for obtaining only the pitch of the pattern marks of the leveling rod at a position on the photoelectric device which is capable of obtaining the pitch in a state before the focusing lens is focused on the leveling rod to thereby obtain a distance to the leveling rod based only on the pitch obtained by the pitch computing means, without scanning an entire distance range for focusing." As such, the present invention

results in the advantage of having an automatic focusing mechanism which is capable of performing the focusing on the leveling rod without the necessity of large modification to the conventional measuring device.

It is respectfully submitted that the prior art fails to disclose or suggest the elements of the Applicant's invention as set forth in claims 1-3, and therefore fails to provide the advantages that are provided by the present application.

Kumagai discloses an electronic leveling apparatus and associated leveling staff to form an image of scale patterns of the leveling staff on a photo-electric transducer by means of a telescopic optical system, and to convert the image into an electrical signal with the transducer and implement the Fourier transformation for the signal with a signal processor, thereby having functions of focusing control and abnormality detection. The leveling staff of Kumagai has an alignment of the first and second (and third) scale patterns aligned in order cyclically at a constant pitch along the length measuring direction, with the first and second patterns having their widths varied in different cyclic periods and the third pattern having a constant width.

Applicant respectfully submits that each and every element recited within claims 1 and 3 is neither disclosed nor suggested by Kumagai. In particular, Applicant submits that the automatic focusing mechanism for mounting on a measuring device as recited in the present application is clearly distinct from that which is illustrated by the cited prior art. Specifically, it is submitted that the cited prior art fails to disclose or suggest at least the element of "a pitch computing means for obtaining only the pitch of the pattern marks of the leveling rod at a position on the photoelectric device which is capable of

obtaining the pitch in a state before the focusing lens is focused on the leveling rod to thereby obtain a distance to the leveling rod based only on the pitch obtained by the pitch computing means, without scanning an entire distance range for focusing.”

Kumagai merely discloses a calculation of a distance from a pitch (see column 4, lines 20-25), and a method for measuring a distance at an electronic level. However, Kumagai does not disclose or suggest that a focusing lens is moved based on the measured distance. Rather, Kumagai (at column 12, lines 7-9), merely provides that focusing operation takes place by obtaining a peak value in an output level of Fourier transform.

In addition, Applicant submits that Kumagai fails to disclose or suggest a “fine adjusting means for moving the focusing lens to a position corresponding to the distance” as recited in the claims of the present application. Specifically, Kumagai merely views a change in an output level of Fourier transform, and determines the focus based on the fact that the magnitude of a signal amplification of a predetermined frequency composition increases as focusing comes to an end, which thereby move a focusing lens. This is neither comparable nor analogous to the “fine adjusting means” of the present invention.

Furthermore, the present invention provides that the focusing lens is inherently driven toward the objective lens to sense the presence of the rod for pitch determination. In contrast, the focusing lens of Kumagai is moved not to determine a pitch, but to detect a peak in an output level of Fourier transform which indicates a frequency corresponding to a pitch.

In addition, the present invention provides that the entire targeted area is not scanned for focusing; only the areas having the leveling rods are detected. The Examiner noted that Kumagai shows "... incident light beam into two directions toward the eyepiece portion 14 and the linear sensor 15. The eyepiece portion 14 is used by the surveyor to sight the scale on the leveling staff 2. The linear sensor 15 is a pattern detector which converts ...". Applicant submits that the teachings of Kumagai are neither analogous nor comparable to the present invention. In particular, the present invention provides that it is unnecessary to scan over the whole range. By contrast, in Kumagai, it is necessary to detect a peak in an output level of Fourier transform. As show in Fig. 5 of Kumagai, a focusing lens is first moved toward the side of short distance, and then, when a peak is detected, the focusing lens is moved to the side of ∞ . That is, it is suggested only that a lens is moved between the front and rear of the peak in reciprocation movement. It is not described that it is unnecessary to scan over the whole range. By contrast, in the present invention, when a predetermined pitch is detected and a distance is calculated, a lens is stopped. Thereafter, the lens is move and positioned to a lens position based on the calculated distance. Therefore, the present invention provides that focusing is completed without scanning the whole range.

In short, the present invention has a feature in that scanning movement is saved, as is clearly different from Kumagai.

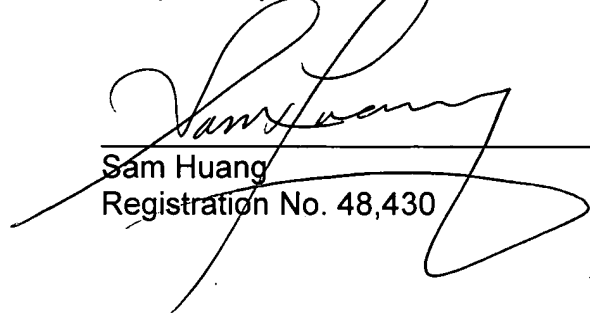
As claim 2 depends from claim 1, Applicant submits that claim 2 incorporates the patentable aspects therein, and is therefore allowable for at least the reasons set forth above with respect to the independent claim.

In view of the above, Applicant respectfully submits that each of claims 1-3 recites subject matter that is neither disclosed nor suggested in the cited prior art. Applicant also submits that the subject matter is more than sufficient to render the claims non-obvious to a person of ordinary skill in the art, and therefore respectfully request that claims 1-3 be found allowable and that this application be passed to issue.

If for any reason, the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact the Applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper has not been timely filed, the Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300 referencing Attorney Docket No. 101136-00013.

Respectfully submitted,



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Enclosures: Petition for Extension of Time (3 months)
Notice of Appeal